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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of : Confirmation No. 4981
Hiroshi TAKANASHI et al. : Docket No. 2000-1749
Serial No. 09/739,750 : Group Art Unit 1752
Filed December 20, 2000 : Examiner S. Lee

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NEGATIVE-WORKING PHOTORESISTIVE
RESIN COMPOSITION AND PHOTORESISTIVE
RESIN PLATE USING THE SAME

APPELLANTS' BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection of June 19, 2002.

1. REAL PARTY IN INTEREST.

The real party in interest is Tokyo Ohka Kogyo Co., Ltd, a corporation of Japan.

2. RELATED APPEALS AND INTERFERENCES.

There are none.

3. STATUS OF CLAIMS.

The claims on appeal are 1 and 3-5.

Claim 2 has been canceled.

4. STATUS OF AMENDMENTS.

The only amendment filed subsequent to final rejection is the amendment to the specification dated November 19, 2002 which was entered.

5. SUMMARY OF THE INVENTION.

The present invention relates to a negative-working photoresist composition as set forth in the appealed claims in which component (E) is present in an amount of 1.0 to 2.0 wt. percent.

As a result of such composition, improved depth and resolution are achieved, as indicated in paragraphs [0063], *inter alia* of the specification.

6. ISSUES.

The issues on appeal are as follows:

1. The propriety of the rejection of claims 1 and 3-5 under 35 U.S.C. 112, 1st paragraph as containing subject matter which was not described in the specification, i.e. lack of written description.
2. The propriety of the rejection of claims 1 and 3-5 under 35 U.S.C. 103(a) as being unpatentable over Pine (U.S. 4,361,640).
3. The propriety of the rejection of claims 1, 3 and 4 under 35 U.S.C. 103(a) as being unpatentable over Tanaka (JP 2-84653) in view of Kunita et al. (U.S. 5,703,140).
4. The propriety of the rejection of claim 5 under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (JP 2-84653) in view of Kunita et al. (U.S. 5,703,140) as applied to claim 1 and in further view of Ichikawa et al. (U.S. 5,744,282).

7. GROUPING OF CLAIMS.

Claims 1 and 5 stand or fall together.

Claims 3 and 4 stand or fall separately of each other and the remaining claims.

8. ARGUMENT.

With regard to the rejection of claims 1 and 3-5 under 35 U.S.C. 112 as containing subject matter which was not described in the specification, the Examiner has objected to the specification for the same reasons as set forth in Official Action paragraph 5.

The Examiner stated in paragraph 8 of the Final Rejection dated June 19, 2002, "In claim 1 (as amended in April 3, 2002), Applicants are claiming the amount of present component (E) to be 1.0 - 2.0 wt. % based on the weight of the solid components of the photosensitive resin composition. There is not support for this limitation in the original disclosure."

In reply, regarding the numerical limitation "1.0 - 2.0 wt.%", attention is directed to the original disclosure containing results obtained when the amounts of component (E) are 1.0 wt.%, 1.5 wt.%, and 2.0 wt.%. See the specification as filed, page 23, Table 1. From Table 1, it is apparent that excellent effect (depth) can be obtained when the amount of component (E) to be incorporated falls within 1.0 - 2.0 wt.%, and particularly excellent effects (depth) can be obtained when 1.0 - 1.5 wt.% (claim 3) is employed.

Thus, the above ranges and effects are contained in the original disclosure.

The amendment in issue was filed on March 7, 2002 to define the amount of component (E) so as to fall within the range of 1.0 - 2.0 wt.% (or 1.0 - 1.5 wt.%), thus narrowing the originally disclosed range of component (E) to restrict the ranges in which effects of the present invention are clear.

This approach is authorized by numerous decisions such as *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

Next, regarding the calculation basis of component (E), this component, the same as other essential components (A) to (D), was calculated on the basis of the solid components of the photosensitive resin composition. In the Examples, all relevant values were calculated in the same manner.

Regarding the interpretation of the word "composition", the Examiner relies on the description in [0056], where water (which is a solvent) is employed in preparation of

"photosensitive resin compositions, and refuses to accept that the word "composition" used in the present invention refers to a composition which does not contain any solvent.

According to the process for preparation of the composition of the present invention, firstly, components (A), then (B) through (E), are dissolved by use of a solvent to thereby yield a liquid. Thus, as clearly described in [0047] and [0048] of the present specification, a solvent is added to prepare a "photosensitive resin composition liquid". Subsequently, the resultant liquid is applied onto a substrate and brought to dryness through removal of solvent. As a result, a photosensitive resin composition formed only of solid matter is obtained. The amount of the solvent is not particularly limited, as long as it provides a coating liquid that can be easily spread on the substrate. The above process is well-known to those having ordinary skill in the art.

More specifically, predetermined amounts of components (A) through (E) (solid components) are dissolved in a suitable amount of a solvent (the amount being such that it suffices to produce a coating liquid), to thereby yield a composition liquid. As stated in the above, the amount of the solvent to be employed may vary depending on process factors. This mode of preparation is quite common in this technical field.

If the amount of component (E) alone is calculated or defined on the basis of a composition liquid containing a solvent, the entire volume of the liquid, including the volume of the solvent, must be computed at some point during the process for preparing the composition. However, such re-calculation performed midway in the preparation process is unrealistic.

Repeatedly, with reference to the descriptions in [0056] of the present specification, in the process of preparing a composition, when the components are dissolved in water (a solvent), the composition assumes a liquid state (hereinafter referred to as a composition liquid). Therefore, before drying, the word "composition" used in [0056] should be correctly understood to be a composition liquid, as disclosed in [0047] and [0048] in the original specification.

In this connection, although the Official Action refers to [0056], without mention of [0047] and [0048], it is clear that the latter two paragraphs support the above explanation.

Again, in describing a composition, if the amounts of some components (components (a) to (d)) are defined on the basis of the composition excluding solvent (i.e., only solid components

" of the composition) and component (E) is defined on the basis of the composition inclusive of solvent, confusion would occur and the art skilled simply would not interpret Applicants' disclosure in such confusing and unrealistic manner.

In the present invention, addition of a very small amount of component (E) to components (A) to (D) provides excellent effects of enhanced depth of non-printing area and resolution. Specifically, in a series of steps in which a photosensitive layer is formed on a substrate (here, note that the layer is constituted by a photosensitive resin composition yielded by drying and evaporating solvents from a composition liquid coated on the substrate) and the layer is selectively exposed to light, followed by development to create a pattern, a predetermined amount of component (E) exerts the above effects. From this point of view, those having skill in the art would readily understand that the amounts of components (A) through (E) are defined on the basis of the weight of the photosensitive layer; in other words, solid content of the composition.

If the amounts of components (A) to (D) out of five components are defined on the basis of the solid content of the composition, and the amount of component (E) alone is defined on the basis of the composition inclusive of solvent, the amount of the solvent contained in the composition must first be determined. However, as mentioned above, the amount of solvent in the present invention is variable within a range capable of producing such a coating liquid that can be readily applied onto a substrate. Ultimately, the solvent is evaporated through drying, and thus, the solvent itself does not contribute to the effects (depth and resolution) of the present invention.

In addition, nowhere in the present specification is it expressly described that the amounts of components (A) through (D) are defined on the basis of the solid content of the composition, whereas the amount of component (E) alone is defined on the basis of the composition inclusive of solvent.

In the Advisory action, paragraph 2, the Examiner refers to the amount of component (E) in Table 1 of the specification in terms of part by weight. The Examiner's remark is erroneous. Correction was made to the expression "X parts by weight" in paragraph [0056] to read "X wt.% based on the weight of the photosensitive resin composition in the Amendment filed March 7,

" 2002.

Accordingly, the rejection under 35 USC 112 is untenable.

With regard to the rejection of claims 1 and 3 - 5 under 35 U.S.C. 103(a) as being unpatentable over Pine (U.S. 4,361,640), paragraph 10 of the final rejection states that Pine teaches 0 - 18 wt.% of o, p-toluenesulfonamide which overlaps the presently recited range of 1.0 to 2.0 wt.% (based on solid components) and 1.0 - 1.5 wt.% (based on solid components).

Therefore, the rejection concludes that Pine's teaching would make the present ranges of claims 1 and 3 *prima facie* obvious.

In reply, unexpectedly excellent results of the present invention are established in Table 1 on page 23 of the present specification, for the range from 1.0 and 2.0 wt.% of component (E).

The Examiner had previously accepted that unexpected results were shown in the range of 0.5 to 2.0 wt.% in paragraph 10 of the Official Action of December 7, 2001. However, the Examiner maintained that Applicants did not show unexpectedly superior results as to the rest of the claimed range which was then 3.5 wt.% or less.

The showing of unexpected results was also substantiated by the Declarations filed on September 25, 2000 and May 23, 2000 in the parent application, copies attached.

The Examiner then reconsidered her indication of unexpected results in the final rejection of June 19, 2002 at paragraph 9 as follows:

"In the previous Office action, claims 2 and 3 were not rejected over Pine '640 because it was the Examiner's position at the time that Applicants demonstrated the unexpected superior results using p-toluene sulfonamide in the range of 0.5 to 2.0 wt.%. However, the Examiner's such conclusion was based on the assumption that the amount of present component (E) shown in Table 1 was based on the total weight of the composition, not excluding the solvent. Since Applicants now amended their claims so as to define the amount of component (E) in wt.% based on the weight of solid components of the photosensitive composition (thereby excluding the solvent) and since the original disclosure never stated that the amount of (E) shown in Table I is based on the total weights of the solid components of the photosensitive composition, it is the Examiner's position that the results shown in Table I have not demonstrated the unexpected

" superior results of using p-toluene sulfonamide in the range of 0.5 - 2.0 wt.% (or 1.0 - 2.0 wt.%) based on the total weight of the solid components of the photosensitive composition. Thus, all of the present claims will be rejected over Pine '640 in this Office action (see below).

For reasons set forth above in connection with the rejection on new matter, it is clear that the results reported in the present specification and in the Rule 132 Declarations of record in the parent application and accepted by the Examiner in the present application, it is clear that the assumption that the amount of component (E) was based on the total weight of the composition, inclusive of solvent, is untenable.

It is clear to one of ordinary skill in the art that the data in the Declarations and in the present specification is based on the total weight of the composition as solids since this is the only reasonable interpretation given to this material by one of ordinary skill in the art.

When this data is appropriately considered, it is apparent that rejection on Pine can not stand.

As a further point, it is also apparent that the range of 1.0 - 1.5 wt.% was set forth in the original claim 3 and can not be new matter.

Therefore, if there is any question about support for the range of 1.0 - to 2.0 wt.% in the original specification, such concern is clearly inapplicable to claim 3.

Further, claim 1 recites two compounds which are o- and p- isomers of each other and claim 4 is only directed to p-isomers. However, the data in Table I on page 23 of the present specification relates to both isomers and shows unexpected results for both isomers in the claimed range. Therefore, if there is any question as to the data of the p- versus the o- isomers, the data in support of claim 4 should be considered separately.

As a final point, it is noted that Pine discloses a range of 0 - 18 wt.% also expresses a preference for 6 - 15 wt.%, however the latter range is outside the presently claimed range where unexpected, excellent results of the present invention have already been substantiated as shown in the Declarations dated May 23, 2000 and September 25, 2000 and the critical significance of the amount of component (E) was properly acknowledged prior to the present Advisory Action which erroneously withdraws this acknowledgment as discussed above.

Turning to the rejections on Tanaka, it discloses a composition containing 0.5 to 10 parts by weight of p-toluenesulfonamide, and Kunita discloses use of a thermal polymerization inhibitor. On the basis of these disclosures, the rejection states that the inventions described in respective claims of the present application are obvious and thus not patentable.

However, the relevant disclosures of Tanaka are limited only to the fact that p-toluenesulfonamide is incorporated so as to obtain improved adhesion of the compound to the substrate. Like the case of the invention of Pine, the invention of Tanaka is silent about the effects of the present invention (i.e., remarkably improved depth of non-printing area in the photosensitive resin plate and improved resolution).

Therefore, even those skilled in the art would not be motivated to make the present invention by use of the respective components in the defined ranges, so as to yield the effects of the present invention.

The criticality of component (E) has already been explained in the above mentioned Declarations and in Table 1 on page 23 of the specification. Therefore, the current 103 rejection over Tanaka should be withdrawn as was the case with the rejection over Pine.

The following calculations are drawn to conversion of the amounts of p-toluenesulfonamide contained in the photosensitive compositions described in Examples of Tanaka to those of p-toluenesulfonamide contained in the solid matter of the same photosensitive compositions:

Comparative Example 2 (Described in the Response to Final Rejection dated November 19, 2002)

$$[1.0/(190+5.0+0.2+1.0+1.0+0.05+1.0)-90] \times 100 = \underline{0.924 \text{ wt.\%}}$$

Comparative Example 3 (also described in the response of November 19, 2002)

$$[3.0/(190+5.0+0.2+1.0+1.0+0.05+3.0)-90] \times 100 = \underline{2.721 \text{ wt.\%}}$$

Comparative Example 4 (newly presented herewith)

$$[5.0/(190+5.0+0.2+1.0+1.0+0.05+5.0)-90] \times 100 = \underline{4.454 \text{ wt.\%}}$$

Examples 1 to 4 (newly presented herewith)

$$[3.0/(190+5.0+0.2+1.0+1.0+0.05+3.0+3.0)-90] \times 100 = \underline{2.649 \text{ wt\%}}$$

Comparative Example 5 (newly presented herewith)

[1.0/(190+5.0+0.2+1.0+1.0+0.05+1.0+3.0)-90]x100 = **0.899 wt.%**

Comparative Example 6 (newly presented herewith)

[5.0/(190+5.0+0.2+1.0+1.0+0.05+5.0+3.0)-90]x100 = **4.338 wt.%**

Comparative Example 7 (newly presented herewith)

[5.0/(190+5.0+0.2+1.0+1.0+0.05+1.0+5.0)-90]x100 = **4.264 wt.%**

As is apparent from the above calculations, Tanaka fails to disclose or suggest the range of component (E) as recited in claim 1 of the present invention (1.0 - 2.0 wt.%) or the range of 1.0 - 1.5 wt% of present claim 3.

Thus, the rejections on prior art are untenable and should be withdrawn.

For the foregoing reasons, reversal of the Final Rejection is respectfully requested.

9. APPENDIX.

A copy of the claims on appeal is set forth in an Appendix to this Brief.

CONCLUSION.

This brief is submitted in triplicate with the requisite fee of \$320.00.

Respectfully submitted,

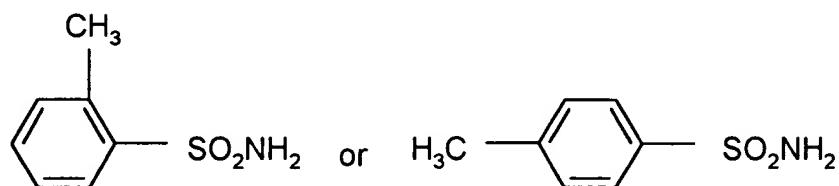
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9. APPENDIX - Claims on Appeal.

1. A negative-working photosensitive composition comprising:
 - (A) a film-forming polymer
 - (B) an unsaturated compound having a radical polymerizable ethylenic double bond,
 - (C) a photopolymerization initiator,
 - (D) a thermal polymerization inhibitor, and
 - (E) at least one member selected from compounds represented by the following formula:



in an amount of 1.0 - 2.0 wt% based on the weight of the photosensitive resin composition (as solids).

3. The negative-working photosensitive resin composition according to claim 1, wherein the amount of component (E) is in the range of 1.0 - 1.5 wt.% based on the weight of the photosensitive resin composition.
4. The negative-working photosensitive resin composition according to claim 1, wherein component (E) is a p-toluenesulfonamide.
5. The negative-working photosensitive resin composition according to claim 1, wherein component (A) is a water-soluble polymer.